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Electronic Business

FOR MANAGEMENT IN ELECTRONICS, COMPUTER & SYSTEMS COMPANIES — WORLDWIDE

JUNE 11, 1990

CANADIAN ELECTRONICS

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Andrew Siman, Canada's director of information technology

Electronic Business

FOR MANAGEMENT IN ELECTRONICS, COMPUTER AND SYSTEMS COMPANIES – WORLDWIDE

VOL. 16, NO. 11 JUNE 11, 1990

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There is no question that the 3,000-mile Canadian-U.S. border is the most important international frontier for both U.S. and Canadian electronics companies. As a result of last year's Canadian-U.S. Free Trade Agreement, there is every expectation that ties between the two partners will grow stronger yet. For second cousin Canadian electronics companies, new trade rules with the U.S. figure to enhance their competitive position in world markets.

Cover photograph: Andrew Siman photograph Mike Pinder. Background photograph by R. Watts/Westlight

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CANADIAN ELECTRONICS

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Canada and the United States are forming a single North American market second only to the European Community in population. Though largely ignored in the U.S., free trade has been a hot political issue in Canada. The concern among Canadians is that with a population of only 26 million, Canada faces a big risk to its industrial base by opening its borders to the U.S.

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If workstations from Sun Microsystems become the industry standard the way IBM personal computers did in the 1980s, then Solbourne Computer wants to be the Compaq of the 1990s. But to reach that goal, Solbourne must perform a series of balancing acts. Solbourne hopes to take a chapter out of Compaq's book by offering Sun-compatible systems, but with added features and competitive prices.

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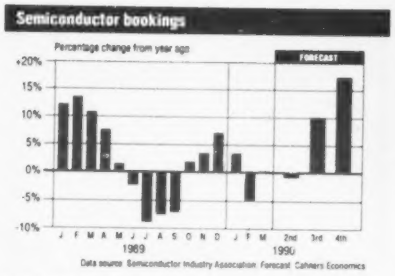

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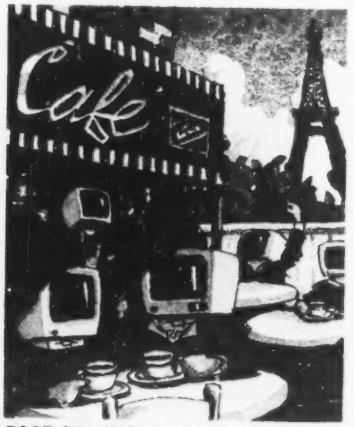

PAGE 64 U.S. personal computer makers reign supreme in France

EUROPE BUSINESS

64 U.S. personal computer makers reign supreme in France

After West Germany, no European country consumed more PCs than France did in 1989. With 40% of the market, IBM, Apple and Compaq dominate sales in France. Meanwhile, France's own microcomputer companies have been struggling for a place in the sun. The last two major survivors of France's computer industry, Bull and SMT-Goupil, are now scrambling to reposition themselves for 1992.

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68 Sales growth slows for U.S. companies in Japan

Despite the cheap dollar and strong pressure to buy American last year, most U.S. electronics companies in Japan saw little improvement in demand. Sales growth last year slowed markedly at almost all the major U.S. companies in Japan. Indeed, growth rates at many of the major semiconductor producers and computer makers didn't even keep up with overall growth in market demand.

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Frameworks that let designers use assorted automated design tools from several vendors are transforming the highly competitive EDA industry. When finished sometime in the mid-1990s, the blueprint for the EDA industry will be completely new. The commitment to openness will replace the hardheaded devotion to proprietary systems of the past.

79 Analog modems race ahead of slow-starting digital systems

If modem makers believed all the projections they read over the past few years, most would be in some other line of business by now. With the promise of all-digital networks igniting imaginations, the future for analog-line modems was about as bright as that for record turntables. But higher speeds, standards and data compression are breathing new life into the analog line.

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Most valuable players

I love sports, and I always like it when I can make an analogy to sports. In this case I'll use basketball, my favorite sport along with baseball, in writing about and introducing the subjects of this column, senior production editor Karen J. Covey and associate art director Carla Aguilar Leeder.

On a basketball team, there are essentially two classes of players — scorers and role players. Scorers get the big contracts and all the glory. But when the team is analyzed from top to bottom it is the role players who usually fuel the success. Let's hear it for the Dennis Rodmans and Kurt Rambises of the world.

Karen and Carla are two such players on the ELECTRONIC BUSINESS team. They do many of the things for the magazine that the reader sees but would not recognize.

Karen's job is to coordinate editorial materials among the different departments and enforce production schedules. After the stories are written and edited, she goes to work, feverishly ensuring that every production element falls into place.

Karen Covey, senior production editor

Carla Leeder, associate art director

Carla designs and lays out the stories that appear in the magazine. She brings the story's physical elements together — text, photographs and charts — into a cohesive package. Not an easy job trying to keep within our format while adding the required artistic sleight of hand.

Needless to say, our team couldn't be a winner without the likes of Karen and Carla.

Doing business in Canada?

When market research companies provide us with data to augment our stories, they normally refer to a "North American market." I suppose they have to do it that way, but, as we all know, North America usually means the United States. But that might be changing. In a special report, senior editor Bruce C.P. Rayner examines the relationship between the U.S. and Canadian electronics industries and says business is picking up between the two nations. Thinking about Canada? This is must reading.

MARVIN GREENE, section editor

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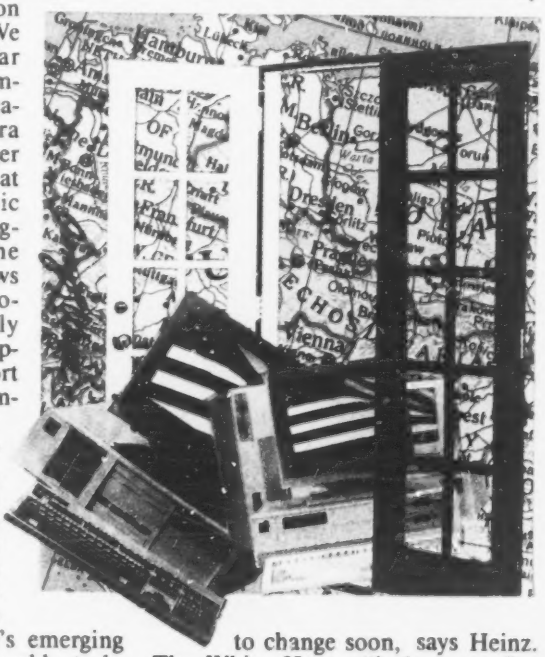
VBPA ABP

TRADE

Industry: Bush is too timid in opening doors to East Bloc

PRESSURE FROM CAPITOL Hill has forced President Bush to relax some restrictions on U.S. technology sales to Eastern Europe and the Soviet Union. The White House proposal would permit exports of certain telecommunications equipment and decontrol sales of computers with processing data rates (PDRs) of up to 275 megabits per second, or mps.

The move is a welcome departure from recent administration policy. However, "We don't think it went far enough in terms of computers and telecommunications," complains Debra Waggoner, trade manager for International Affairs at the American Electronic Association in Washington. For one thing, she says, the proposal allows telecommunications producers to export only relatively primitive equipment, which falls far short of Eastern Europe's communications needs.



Moreover, China is already freely buying U.S. computers with a PDR of 550 (called the "China Green Line"). The least the United States can do, according to Sen. John Heinz (R-Pa.), is to support Eastern Europe's emerging democracies with comparable technologies.

But the Bush proposal would decontrol only fairly slow personal computers and such small business computers as IBM's AS 400. Computers from Digital Equipment Corp. and Hewlett-Packard Co. are also on the list. Lifting restrictions on equipment with a PDR of 550 would permit sales of some mainframes — such as Control Data's Cyber 910 and IBM's 4381 MG 24 — for use in commercial applications, including banking and airline reservations.

Nor does the new proposal seem to address marketing plans by companies in Western Europe and Japan. In fact, the biggest benefits may accrue to U.S. competitors who offer low-level computers at lower prices, says Unisys Corp. lobbyist Dan Hoydysh. Eastern Europe needs big mainframes, networking connections and CAD/CAM software, he says, not just PCs. And from Unisys' point of view, the more viable marketplace is the Soviet Union, which is still excluded from the Bush proposal.

That situation, however, is unlikely to change soon, says Heinz. The White House "is between fire and ice," Heinz explains. "If they don't go as far as with China, it freezes out new democracies. On the other hand, decontrol of the USSR up to the Green Line is playing with political fire, and the president is on the hot seat with the Lithuania situation."

The administration also recommends dropping 30 of the 120 export categories now restricted by COCOM, an export-control alliance of 17 Western nations, and relaxing 13 others. The revised list of restrictions would still include strategically critical items. The plan would approximately halve the number of licenses — about 81,000 last year — required by the Department of Commerce.

One thing everyone seems to agree on: Eastern Europe is anxious to catch up to the rest of the world, especially in telecommunications, if it hopes to keep up with fast-moving events in neighboring countries. It can take up to four hours to put through a long-distance call in Eastern Europe, according to Heinz, who recently returned from a tour of the region. "The operators stop working at four in the afternoon," he says, thus delaying calls until the next day.

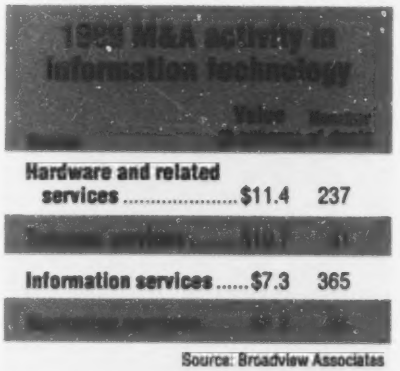
The White House would decontrol sales of such telecommunications equipment as satellite ground stations for civilian television and communications to permit broadcasting from Western Europe. Licensing for civilian packet switching systems would be regulated under the same guidelines as those now in effect for China. Exports of fiber-optic equipment with transmission rates up to 156 mps would be permitted only after countries adopt safeguards to protect against diversion to military uses.

PAM NAZARUK

MERGERS & ACQUISITIONS

Fewer M&A deals in '89, but the values rise

THE NUMBER OF MERGERS and acquisitions in the information technology industry dipped in 1989, but the total value of the deals rose, according to a recent study by Broadview Associates, an M&A investment firm in Fort Lee, N.J. However, while the number of deals was down in


1989 M&A activity in information technology
Value
Number
Hardware and related services $11.4 237
Information services $7.3 365

Source: Broadview Associates

aggregate, the hardware sector bucked the trend.

In total, IT deals fell from 773 in 1988 to 717 last year, but the value rose from $23.8 billion to $32.6 billion. Small deals dominated the buying, while large deals accounted for the majority of the value. Fifty percent of all the deals were under $10 million in 1989, up from 45% in 1988. In terms of dollar value, small deals accounted for only 3% of total M&A activity, up from 2% in 1988.

The number of M&As in the hardware sector rose from 216 to 237 between the two years and the value rose from $10.2 billion to $11.4 billion. Purchases of communications equipment companies topped the sector in terms of number of deals with 57 in 1989, while computer firms ranked first in terms of value at $4.3 billion, Broadview reports.

"The hardware area is as active as ever, and I assume it is going to continue at the $10 billion to $11 billion a year rate," says Stephen Smith, head of the hardware practice for Broadview in San Francisco. Major deals in the hardware sector last year included Hewlett-Packard Co.'s purchase of Apollo Computer Inc. for $476 million, Seagate Technology Inc.'s purchase of Imprimis Technology Inc. from Control Data Corp. for $450 million, and South Korea's Daewoo Corp.'s acquisition of Leading Edge Products for $360 million.

BRUCE C.P. RAYNER

COMPUTER BOWL

So who is this "Bubbles" anyhow?

AFTER TRAILING throughout the competition, the West Coast technoweenies managed to squeak by the East Coast nerds in sudden death overtime in the second annual Computer Bowl benefit, held recently in Boston.

Industry big shots from both coasts contested one another on the high-tech quiz show, which benefits the Computer Museum in Boston.

The event raised more than $275,000, according to a museum spokeswoman.

The East Coast team won handily a year ago, but the West Coast avenged its humiliating loss and now

has possession of the much-coveted Computer Bowl trophy until the battle is resumed again next year.

Contestants for the West Coast included team captain L. John Doerr, venture capitalist with Kleiner Perkins Caufield & Byers; Bill Gates, chairman of Microsoft Corp.; Stewart Alsop II, editor-publisher of *PC Letter*; Charles House, general manager of the Software Engineering Systems Division at Hewlett-Packard Co., and Lawrence Tesler, vice president of advanced technology at Apple Computer Inc.

The East Coast consisted of captain Patrick McGovern, chairman of International Data Group; Russell Planitzer, chairman of Prime Computer Inc.; William Foster, CEO of Stratus Computer Inc.; Robert Frankston, chief scientist at Lotus Development Corp., and Edward Fredkin, Boston University physics professor.

How many people could tell you that the University of North Carolina's computer science department was the first to have a computer? Or that the Mayan numerical system was a base 20 system?

These guys knew those answers and many more.

Of course, some of the fun was provided by those who weren't able to score points on seemingly easy questions. Apple's Tesler, for instance, didn't get the points for "Who is the highest paid CEO?" The answer: John Sculley, his boss. Then there was HP's House. He could only shake his head as the opposing team correctly answered that "reverse Polish notation" is the nickname for the data-entry method used on HP calculators.

Oh, by the way, in case you were wondering who "Bubbles" is . . . that's the nickname for a Cray 2 supercomputer.

GIUSEPPE LABIANCA

SOFTWARE

Lotus and Novell: The marriage is off

A MARRIAGE MADE in heaven, this one wasn't. Lotus Development Corp. and Novell Inc. abruptly called off their planned $1.5 billion wedding last month after Novell's demand for more representation on the board of directors left Lotus waiting at the altar.

What came between the happy couple? No less than a jealous third party — Novell's stockholders.

In the letter of intent struck between the companies in April, Cambridge, Mass.-based Lotus was to have four representatives on the board, while Novell of Provo, Utah, would have three. But on May 18, Novell unexpectedly demanded that each company seat four members.

In a conference call after the negotiations ended, Raymond Noorda, Novell's chairman, president and chief executive, acknowledged that maintaining shareholder value was a prime concern of Novell's management.

Saying the company "did not want to shortchange shareholders," Noorda described the demand for a fourth seat on the board as necessary to insure that the Lotus-Novell combination would be "a merger of equals" as stated in the letter of intent. He did not call the issue of a fourth board seat a new demand, but "an additional factor that had been brought to our attention" by company executives and stockholders.

Observers say that Novell stockholders were simply unhappy with the merger deal as originally presented, and that Novell's management was under pressure to drive a harder bargain.

But Lotus could not go along. "We felt the four-four composition would create the potential for board polari-

zation and (was) a prescription for deadlock and disruption to our business," Lotus chairman, president and chief executive Jim Manzi explained to employees in a memo circulated after the merger plan fell through.

The original merger pact called for Manzi to serve as chairman, chief executive and president of the new company, which was to be called Lotus/Novell Corp., while Novell chairman, president and chief executive Raymond Noorda would be vice-chairman. But during the talks, the two sides agreed to make Noorda chairman of the new company as well.

Using a $1.5-billion stock swap as the vehicle, the merger would have created a company with expected annual sales of around $1.2 billion. Given Lotus' domination of the spreadsheet software market and Novell's sizable share of the personal computer networking market, the combined companies would have presented a formidable challenge to software giant Microsoft Corp.

Lotus has played the "unsuccessful in love" role before. Negotiations to merge with Microsoft, Redmond, Wash., went nowhere in 1986, and a 1987 plan to combine with Ashton-Tate Co. was shot down by the Torrance, Calif., company's board.

RICK WHITING

SHAREHOLDERS

Shareholders speak out for accountability

THE UNITED SHAREHOLDERS Association has a message for America's corporate management: You are accountable to us.

In order to gauge America's largest corporations based on responsiveness to investors, the USA has compiled its second annual listing that rates the 1,000 largest publicly traded corporations. Companies were judged on stock performance and management accountability, rather than on size. They were selected from such lists as the *Fortune* 500, Standard and Poor's, and the New York, American and Over-the-Counter exchange listings.

Ratings are broken down by three criteria: economic performance, 50%; adherence to shareholder rights, 25%; management compensation and stock ownership, 25%. Companies are scored in each area to arrive at a total score, then ranked 1 to 1,000 based on the overall scores. With a possible score of 100, the 1,000's average was 47.6.

The top-ranked company is Wal-Mart Stores with an 81.25 score. In the electronics industry, for instance, big companies such as Apple Computer Inc. (79th) and IBM (488th) had total scores of 61.90 and 48.10, respectively.

The Washington-based USA — with about 60,000 members — was formed in August 1986 to provide a unified voice for shareholders.

BARBARA JORGENSEN

How responsive are electronics companies?

Here's how the USA rates electronics companies on its 1,000 ranking. Listed are those companies that also appear on the ELECTRONIC BUSINESS 200

Bottom 10

Name	Ranking
LTV	1,000
Bally Mfg	996
Control Data	992
Data General	989
M/A-Com	985
Unisys	979
Tie Communications	974
Textron	973
Arrow Electronics	972
Prime	970

Source: United Shareholders Association

EUROPE

Philips reshuffles after poor first quarter

AT PHILIPS' ANNUAL press conference in March, the then-chairman Cor van der Klugt was asked why Jan Timmer was chosen to succeed him in July 1991. A huge man, Timmer broke into a smile, his eyes rolling skyward. Quietly, van der Klugt replied, "Because we couldn't find anybody better."

Apparently not. In a shocking move two months later, Philips removed van der Klugt a year earlier than planned in response to Philips' abysmal and unexpected first quarter results. Earnings in the first quarter fell to $3.2 million from $121.2 million in first-quarter 1989. Timmer has been lauded for making the consumer electronics division profitable, and seems eager to try his hand at the profit-draining computer and semiconductor units.

This 57-year-old troubleshooter is a pure company man. "I'm only a poor consumer electronics man," he quipped in March, under orders from Philips not to answer questions that touched on his future role and that infringed on van der Klugt's territory.

But now the muzzle is removed. Van der Klugt was a mouthpiece for Philips' corporate position on global free trade. He wanted to promote Philips as a European company with a protected place in European industry. He believed staunchly that it is government that must protect industry and prevent foreigners from dumping their wares.

In contrast, Timmer is a slow speaker fond of emotionally guarded phrasing. Like van der Klugt, he is moved by free trade issues into a passionate treatise on markets and macroeconomics. And like his predecessor, he optimistically embraces the company gospel: New management in Philips' less profitable units will successfully turn Philips around.

BARBARA N. BERKMAN

Lifting the barriers: Canadian-U.S. electronics trade

As trade barriers are lifting, Canada and the United States form a single North American market. Will Canada's electronics industry win or lose?

BY BRUCE C.P. RAYNER

There is no question that the 3,000-mile Canadian-U.S. border is the most important international frontier for both U.S. and Canadian electronics companies. Going north in 1989 was $7.992 billion in U.S. electronics exports. That's $506 million more than the United States exported to Japan. Coming south was $4.4 billion in Canadian electronics goods, about 70% of Canada's total electronics exports.

As a result of last year's introduction of the Canadian-U.S. Free Trade Agreement, there is every expectation that ties between the two trading partners will grow stronger yet. "The FTA has certainly brought our two countries closer together," says Andrew Siman, director of information technologies industry development in the government's Industry, Science and Technology Canada department (ISTC) in Ottawa.

Like the European Community unification scheduled for 1992, the FTA is creating a single North American market. With a combined Canadian and U.S. population of 270 million, North America is second in population only to the European Community with its 324 million people.

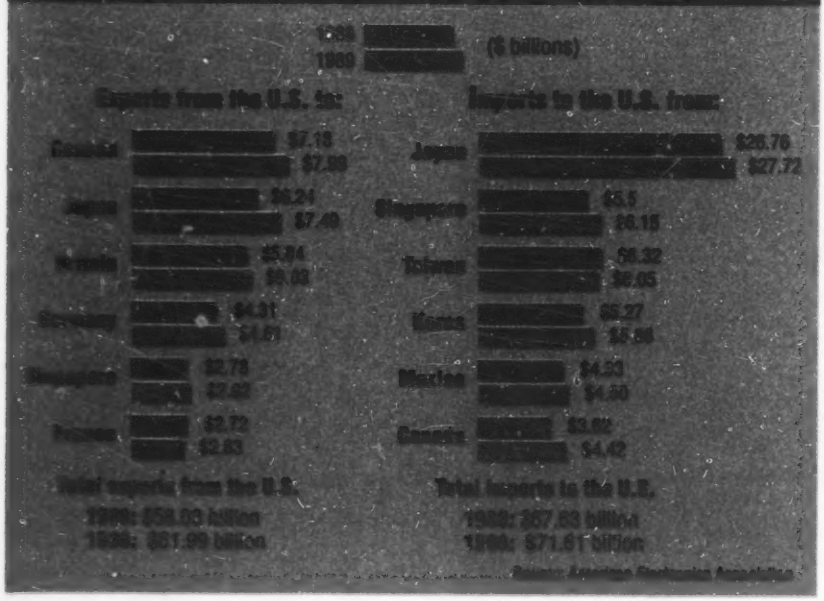
Though largely ignored in the United States, free trade has been a hot political issue in Canada. With a population of 26 million, Canada faces the bigger risk to its industrial base by opening its borders. While trade unionists and some politicians have railed against the agreement as a threat to Canadian jobs, the tiny $16.5 billion technology sector is generally in support of free trade.

Now in its 18th month, the FTA makes the Canadian-U.S. border virtually transparent. It has five goals: removing tariffs on all goods between Canada and the United States within 10 years, freeing the movement of personnel across the border, loosening the flow of investment funds, increasing bilateral participation in federal procurement programs and establishing a formal dispute settlement mechanism.

Most important for electronics trade between the two countries are tariff removal and personnel mobility. For instance, within five years the agreement will eliminate the 17.5% duty on most telecommunications equipment coming into Canada from the United States and the 10.5% duty on the same type of equipment coming into the United States from Canada. Tariffs on most other electronics goods averaged between 3% and 6% in the past, and many of these have already been removed.

As for personnel, under the FTA's temporary access provisions, electronics companies are now able to

Canada's place in U.S. electronics trade



Mike Pinder

Canada's information technologies man

Andrew Siman is the chief Canadian government official responsible for developing Canada's information technologies industry. That includes making sure the IT industry gets its concerns heard in the right government circles. Like any government bureaucrat worth his weight, Siman has a title a mile long: director, Industry Development Directorate, Information Technologies Industry Branch of Industry, Science and Technology Canada (ISTC), Ottawa.

ISTC works in partnership with Canada's IT industry via various programs and services. These include:

1. Strategic technologies program: government sponsorship for the development of strategic alliances between government, academia and industry.

2. Microelectronics and systems development program: funding pre-competitive R&D in IT to improve Canadian competitiveness.

3. Export market development program: includes repayable contributions for companies pursuing major export markets. Sponsored by Canada's Department of External Affairs, ISTC promotes this program within the IT industry.

4. Government procurement programs: advice to IT companies on qualifying for government business. Much government business is restricted to multinational companies that qualify under the rationalization programs.

What about the impact of the Free Trade Agreement on Canada's IT industry? It's a plus. "It has served to highlight not only the similarities that already exist between Canada and the United States," Siman says. "But also to point out the immense opportunities in Canada in terms of both R&D and markets." Time will tell.

Andrew Siman, director, Industry Development Directorate, Information Technologies Industry Branch of Industry, Science and Technology Canada (ISTC), Ottawa

send sales, service and support staffs across the border more freely. The new regulations reduce the impediments for temporary entry.

Cross-border personnel mobility is perhaps the most important change for many of Canada's technology companies, ISTC's Siman says. For example, CAE Industries Ltd., the $1 billion Canadian aerospace and electronics company, is expected to shift some of its U.S.-based personnel up to its subsidiary, CAE Electronics Ltd., in Montreal this summer. The FTA has helped to grease the wheels with the immigration authorities, says Robert F. Kemerer, vice president of international affairs at CAE Electronics.

Mike Pinder

Canada's new goods and services tax may increase the cost of doing business, says John Wandell, senior vice president of North American sales and service at telecommunications equipment maker Gandalf Technologies

Free trade also means more spending on productivity-enhancing electronics equipment. One government estimate forecasts that Canadian business investment in plant and equipment will increase by more than 4% in real terms by 1993. Much of that is for electronics.

"The Canada-U.S. Free Trade Agreement has been conducive to making additional investments in our Canadian manufacturing operations," insists John M. Thompson, chairman and chief executive of IBM Canada Ltd., the $3.56 billion Canadian arm of IBM. IBM Canada's investment grew by 26.5% to $361 million last year, 41% of which went into the company's software research and development center in Montreal.

Free trade is only one part of Canada's capital investment picture. A new Canadian goods and services tax — the controversial GST, scheduled for a January 1991 introduction — will halve the tax on manufactured goods from an average 13.5% to 7%. The result, supporters say, will be a lower cost of capital and a more import-competitive Canadian manufacturing sector. "It will put us on an equal footing with foreign companies," says Michael McCracken, economist and president of Informetrica Ltd. in Ottawa.

But many in industry are unconvinced the GST will be a net benefit. "The perception in the business community is that it will increase costs,"says John Wandell, senior vice president of North American sales and service at Gandalf Technologies Inc., Nepean, Ontario, a leading telecommunications company. The reason is the additional administrative and bookkeeping expense that the new tax will require; the higher cost may offset the lower tax rate.

Despite the structural changes caused by changing trade and tax policy, most Canadian electronics executives say the impacts of free trade have so far been minimal and expect the effects of the GST to be equally small. At best, they introduce subtle advantages in the daily global battles that Canadian electronics companies wage. At worst, it's business as usual.

Proponents of the new policies insist they will improve the long-term competitive position of Canadian electronics companies in world markets. "Our goal is to build a stronger foundation in which information technology companies can reach their full potential," Siman says.

That strong foundation is essential

What is the Canada-U.S. Free Trade Agreement?

Now in its fifth month, the FTA makes the Canada-U.S. border virtually transparent. It has five goals:

1. removing all tariffs on all goods within 10 years;
2. freeing the movement of personnel across the border;
3. loosening the flow of investment funds;
4. increasing bilateral participation in federal procurement programs;
5. establishing a formal dispute settlement mechanism.

By 1993 the impact in Canada of the FTA agreement will be to:

1. increase business investment in plant and equipment by more than 4% in real terms;
2. increase manufacturing output by more than 10%;
3. increase consumer spending by 2%;
4. raise Canadian exports in volume terms by 3.4%;
5. produce a gross domestic product approximately 2% higher than without the agreement;
6. reduce average production costs for Canadian manufacturing by more than 3%;
7. increase Canadian real income by at least 2.5%.

for Canadian electronics companies. The Canadian economy is just too small to allow world-class companies in the industry to achieve economies of scale. As a matter of course, Canadian companies must turn to foreign markets. It is not uncommon for foreign sales to account for 70% or more of a company's total revenue.

"We do not believe that any telecommunications equipment manufacturer can afford to rely on its home market alone for long-term growth," said Paul Stern, Northern Telecom Ltd.'s chairman and chief executive, in a recent speech. "That's why in recent years we have focused top R&D resources and seasoned senior marketing talent on building our offshore business."

Northern Telecom, based in Mississauga, Ontario, derived 67% of its $6.1 billion worldwide 1989 revenue from sales outside Canada, 57% from the U.S. market alone. Its U.S. revenue was up 8% last year, while non-North American business increased 34%. Northern Telecom is the second largest telecommunications company in North America behind AT&T and the sixth largest captive chip maker in the world.

The same global thinking applies at $367 million Mitel Corp., the number two Canadian telecom player, headquartered in Kanata, Ontario. Mitel holds [illegible] market share of the U.S. [illegible] anch exchange market. [illegible] essity, all telecommunications companies in Canada focus their efforts abroad," says Leo Lax, assistant vice president of marketing and operations at Mitel.

It's well known that Canada's telecommunications industry is world class — it was in Brampton, Ontario, that Alexander Graham Bell invented the first telephone — but it's not so well known that the country also excels in software development. Companies such as $85 million Cognos Inc. of Ottawa, the country's largest software company, are respected around the world as innovators.

Not only is software easily exportable, but so are software engineers. Microsoft Corp., based in Redmond, Wash., hires a sizable number of its entry level software engineers out of Waterloo University in Montreal every year, a Microsoft source says. One estimate put the figure as high as 10%.

While Canadian companies have no choice but to look outward, a growing number of foreign electronics corporations are targeting Canada for expansion. Dutch-based N.V. Philips GL is investing about $40 million to build a new Montreal personal computer plant. The facility is part of Philips Electronics Ltd. and has a mandate to produce all of Philips' PCs for sale worldwide. The operation performs all research, development and manufacturing functions; employs 1,000 people; and can produce up to 750,000 units a year.

The location decision came down to either Montreal or Boston, Philips Electronics chairman and president Dieter Siegelberg says. The deciding factor was that Philips already had a Montreal word processing company, so the infrastructure was already in place. Also, engineers are easier to find and keep in Montreal, and costs are comparable to the United States, Siegelberg claims.

Hughes Aircraft Co., a division of General Motors Corp., recently set up three operations in Canada, all with worldwide supply mandates. Headquartered in Calgary, Alberta, Hughes Aircraft of Canada Ltd. is ramping up R&D and production of air traffic control systems, acoustic instruments and digital computer-to-computer communications products. The goal is to become a 100% Canadian company, a Hughes representative says.

Most of the major Japanese consumer electronics players are in Canada, too. Of the top 50 electronics companies operating in Canada, six are Japanese, notes *Canadian Electronics Engineering*, a Toronto-based trade magazine. They are: Matsushita Electric of Canada Ltd., Toshiba of Canada Ltd., Mitsubishi Electric Sales Canada Inc., Canada Ltd., Sanyo Canada Inc., Hitachi (HSC) Canada Inc. and Sharp Electronics of Canada Ltd. For some of them, a Canadian base is a good launching pad for exporting into the United States.

Mitsubishi Electronics Industrial Canada Inc., one of four Canadian Mitsubishi companies, is gearing up

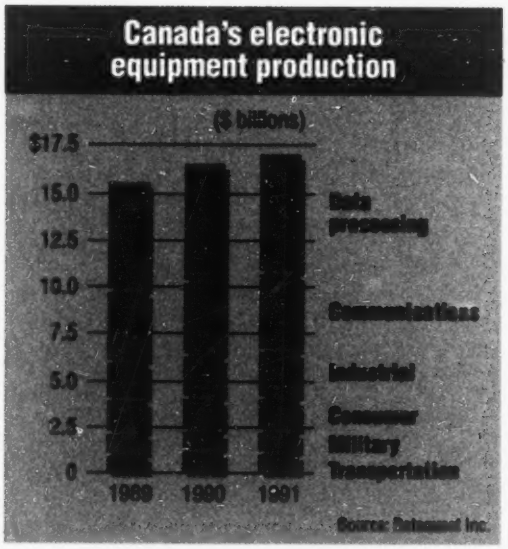
Top electronics companies in Canada

Rank	Company	Fiscal 1989 data: Sales ($ billions)	Net income ($ millions)	Percentage foreign ownership	Country of origin
1	Bell Canada Enterprises[1]	$12.96	$754	8%	Canada
2	IBM Canada	3.56	221	100%	U.S.
3	United Westburne	1.93	NA	94%	France
4	Anglo-Canadian Telephone	1.67	164	86%	U.S.
5	General Electric Canada	1.35	64	100%	U.S.
6	Xerox Canada	0.90	63	79%	U.S.
7	Alberta Government Telephone	0.91	47	0%	Canada
8	Digital Equipment of Canada	0.82	36	100%	U.S.
9	Westinghouse Canada	0.74	NA	100%	U.S.
10	Philips Canada	0.59	NA	100%	Holland
11	Rockwell International of Canada	0.46	36	100%	U.S.
12	3M Canada	0.44	43	100%	U.S.
13	Saskatchewan Telecommunications	0.43	54	0%	Canada
14	Litton Systems Canada	0.43	9	100%	U.S.
15	Allied Signal Canada	0.43	20	100%	U.S.
16	Mitel[2]	0.37	-28	51%	Britain
17	Honeywell	0.35	16	100%	U.S.
18	Matsushita Electric of Canada	0.34	NA	100%	Japan
19	International Semi Tech Microelectronics	0.33	10	0%	Canada
20	Motorola Canada	0.33	8	100%	U.S.

[1] Includes $6.1 billion for Northern Telecom Ltd. BCE is Northern Telecom's holding company; other operations include telecommunications services and R&D, financial services and natural resources

[2] British Telecommunications has annouced it will sell off its 51% ownership of Mitel

Source: Canadian Electronics Engineering, ELECTRONIC BUSINESS



to supply the entire North American television market from its Midland, Ontario, facility. Thanks to the elimination of tariffs, the facility will be price competitive in the United States in a few years, Mitsubishi Electronics vice president and general manager Jim Smith says. The tariff rate on TVs entering the United States from Canada was around 5% before FTA went into effect and will be reduced by 10% a year over the next 10 years.

Although welcome by the government, Japanese companies are viewed with suspicion by some in Canada. A case in point was the politically controversial 1989 acquisition of Lumonics Inc., a maker of high-tech lasers based in Kanata, Ontario, by Sumitomo Heavy Industries Ltd. of Japan. The $71 million friendly takeover gives Lumonics much needed capital for product development and allows the company access to the lucrative Far East market, company president and CEO Hugh MacDiarmid argues. Without Sumitomo's money, Lumonics would not be able to compete internationally, he says.

More Japanese purchases are expected, many electronics executives say. When small Canadian companies go looking for funds, they usually turn to Japan rather than the United States, insiders say. The reason is patient capital. The Japanese are eager to oblige as they view Canada as a stable market in which to sink their money.

As part of the FTA, the Canadian government has helped foreign acquirers of Canadian companies by simplifying the government's review procedure. That includes raising the value of an acquisition that requires a review from $21 million in 1989 to $127.5 million in 1992. Major deals in Canada's electronics industry — many involving foreign companies — have averaged six a year for the past three years. Because of this easier review process, the pace is expected to pick up. The most recent data from the Royal Bank of Canada shows total merger and acquisition activity up 31% in the first half of 1989 compared with the first half of 1988; 51% of those deals involved foreign investors.

The ISTC is also helping facilitate foreign involvement in Canada. The agency promotes an open environment for international high-technology involvement in Canada by playing matchmaker for technology alliances and cross-border cooperation in sourcing products. Most recently ISTC encouraged a strategic alliance between IBM and Delrina Technology Inc., a Toronto-based software company specializing in computerized business forms. The deal involved a minority equity investment by IBM. "We are in a global industry," ISTC's Siman says, "so strategic alliances between Canadian and foreign companies are a benefit."

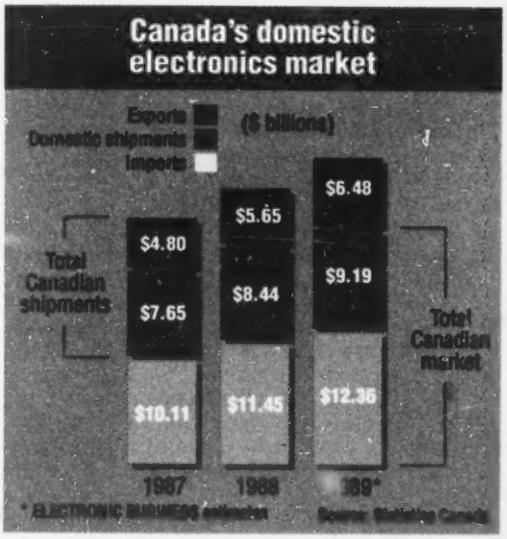
Canada is also looking for R&D alliances, he says. Through the Canadian Microelectronics Action Committee, a working group of 20 leading Canadian technology companies sponsored by the ISTC, talk is focused on bolstering R&D in semiconductors and related equipment. Siman would like to see Canadian involvement in U.S.-based semiconductor and equipment research consortia as well as membership in trade groups such as the American Electronics Association (AEA).

There is a ray of hope on the R&D front. Last year the Microelectronics and Computer Technology Corp. (MCC), the U.S. integrated circuit packaging consortia in Austin, Texas, opened its membership to Canada's Northern Telecom. In April four Canadian companies attended MCC's semiannual associate members' technology briefing. "I believe the Free Trade Agreement had a lot to do with MCC's decision to open up to Canadian companies," Siman comments. Sematech Corp., the U.S. semiconductor equipment consortium, on the other hand, has no plans to open its doors to Canadian participation, a representative says.

Provincial governments are promoting high-tech too. Most of the 10 provincial governments have technology development offices. One of the most successful has been Alberta. Because of its dependence on oil, Alberta faced economic ruin in the 1980s, when oil prices dropped sharply. The answer was diversification into electronics.

Canada's trade policy is also affecting foreign participation in the lucrative $2.4 billion federal computer market. The FTA has lowered the threshold for U.S. company participation in some government purchases from $171,000 to $25,000. For FTA exempt business with the government, U.S. companies have to qualify under a rationalization program.

Rationalization sets guidelines for



Canada's venture capital market: an uphill battle for high tech

Whichever way you cut it, the deck is stacked against Canadian high-tech start-ups. First of all, the venture capital market is small: Venture capitalists raised only $180 million in 1989 for a cumulative capital base of $2.8 billion. But even if the money is available, it is rare to find venture capitalists who understand high technology, entrepreneurs say. Countering that, venture capitalists claim Canadian entrepreneurs lack experience.

As a result, the pace of start-up activity in Canada is slowing. Venture capitalists can't raise as much money as they could in the heyday of the mid-1980s, and the money that is there is more likely to go into later-stage funding or leveraged buy-outs. According to Venture Economics Canada Ltd. in Toronto, 1990 will be another year of consolidation in the Canadian venture capital industry.

More fundamental than the lack of availability of money is the lack of high-tech experience within Canada's venture capital community. Only about one quarter of all venture money raised in the country in 1989 goes into technology-based companies. "The problem in Canada is not lack of money; it's getting investors to understand electronics, both hardware and software," says one venture capitalist.

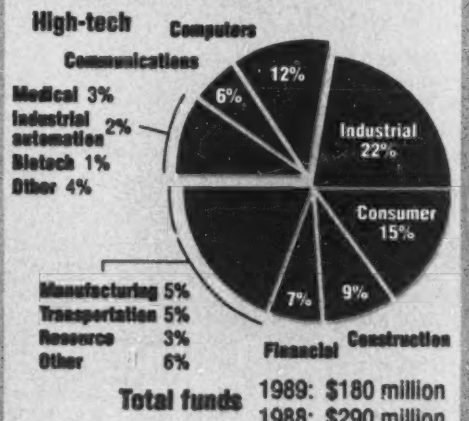
Experience is not exclusively a shortcoming of venture capitalists. "The most fundamental long-term difference between the United States and Canada is our inability to accumulate good management in this country," says Michael Brown, president of $85 million Ventures West Management Inc. in Vancouver.

The reason, Brown says, is the structure of Canada's high-tech industry. Most of the technology companies that would normally generate spin-offs are foreign owned. Most of the important strategic decisions are made outside Canada. That means Canada's entrepreneurs lack the marketing and product-related skills needed to succeed in the international market. "There is a lot of technology up here, but the quality of management to run those companies is lacking," he says.

What's the solution? According to three of Canada's leading technology industry trade groups — the Canadian Advanced Technology Association (CATA), the Information Technology Association of Canada (ITAC) and the Canadian Association of Data Processing Service Organizations (CADAPSO) — there should be more cooperation among government, industry and private venture capitalists to help entrepreneurs get their ideas to market. Their proposal to the federal government, dubbed Phoenix, calls for government-backed loans of up to $8.5 million for companies with sales between $2.6 million and $43 million. It's a start, but most high-tech entrepreneurs agree that more is needed. □

Who gets venture capital in Canada

Percentage of 1988 venture funds committed



Source: Venture Economics Canada Ltd.

local manufacturing, sourcing, R&D and exports. Currently nine foreign companies qualify: Groupe Bull, Digital Equipment Corp., IBM, Motorola Inc., NCR Corp., Sun Microsystems Inc., Unisys Corp. and Xerox Corp.

Government business, in fact, is the reason Sun Microsystems Canada Inc. exists. The Toronto company recently qualified under rationalization. As a result, Sun's Canadian government business is experiencing phenomenal growth, says Everett Anstey, president of the Canadian subsidiary. Currently Sun does about $85 million worth of business in Canada with only about 15% coming from the government. That percentage is expected to increase dramatically in the future, he says.

Qualification also means Sun has to export 70% of the value of its imports within three years or else forfeit its favored status. As part of its commitment to supporting the Canadian economy, Sun opened a software R&D laboratory in Montreal in the early part of this year.

Rationalization has benefited LSI Logic Corp. too, says Perry Constantine, CEO of LSI Logic Canada Ltd.: "In the past six months several U.S. companies have said they are interested in dealing with us in order to meet the Canadian content requirements."

Taking its lumps

Even though most business leaders agree that North American unification has long-term benefits for Canada, the country's economy is taking its share of short-term lumps. Persistent inflation has kept interest rates rising and sent the Canadian dollar to a nine-year high against the U.S. dollar. That hurts exports and slows the economy.

As in the United States, the Canadian economic picture for 1990 is gloomy. Economists are forecasting Canadian gross domestic product (GDP) growth of between 1% and 1.5% this year, down from 2.9% in 1989. Unemployment will climb to 8.5%, up from 7.7% last year; and because of a stronger Canadian dollar, Canada's merchandise trade balance is expected to plummet to a $1.6 billion surplus this year, down from $4 billion in 1989, says Robert Fairholm, managing economist for Data Resources Inc. in Toronto.

Part of the upward pressure on interest rates can be traced to the GST, economists say. With the introduction of the across-the-board consumption tax next year, consumer prices will receive a one-time boost. The Canadian government is keeping a tight reign on interest rates now to ensure that the boost will not be too severe. As a result, the Canadian dollar is not expected to come down much in the near term, which seriously offsets the expansionary effects of the FTA on the Canadian economy.

The GST could be negatively influencing capital spending plans, too. Since capital goods are expected to be cheaper after the new tax goes into effect, some planned increases in spending may be postponed, industry analysts say. But these pessimists are in the minority. The need for productivity enhancement created by the FTA has kept capital spending higher than expected for the past two years. Outlays on machinery and equipment, including electronics, shot up 16% last year, the Royal Bank of Canada reports. Also, a survey of machinery and equipment investment plans by Canadian businesses points to a 10% increase in investment in 1990.

All this is good news for U.S. electronics companies, many of which are already well established with subsidiaries in Canada. In fact, Canadians argue that the relationship favors large U.S. companies more than Canadian ones. The reason is that with free trade U.S. companies may find they no longer need such a strong presence in Canada, because their goods can now be exported duty free into the country without a local subsidiary. Recent U.S.-owned plant closings and layoffs in Canada by General Motors Corp., among others, have brought criticism from labor unions claiming that the FTA is to blame.

There is no compelling evidence

Life on the silicon tundra

The name is appropriate. Dubbed the silicon tundra, Canada's small semiconductor industry must weather a harsh environment. To survive, it has had to become highly specialized, focusing on niche markets. In all, the country produces only about $300 million in chips a year. Imports satisfy the remainder of Canada's $1.2 billion domestic consumption.

Annual growth in Canada's semiconductor industry averages around 10% a year with most of the production driven by exports, says Alan Aitken, a semiconductor consultant and president of Canadian Semiconductor Design Association, in Ottawa. Aitken estimates that about 90% of all domestically produced semiconductors are exported. "The only reason we have any industry at all is because of telecom," he says.

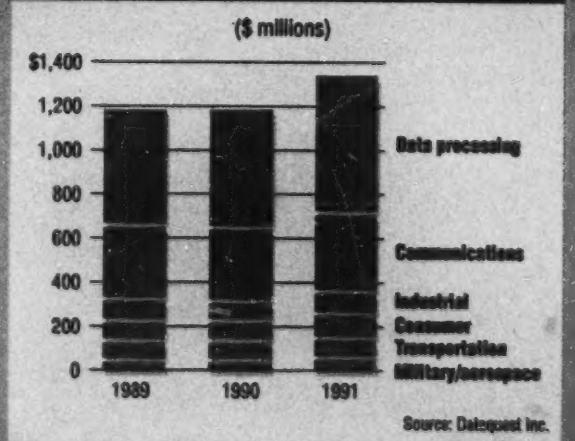
There are exceptions. One is the successful attempt by Alberta to diversify its economy away from oil and into microelectronics. The province was the first to initiate a seed capital fund specifically for high-technology companies. Alberta also has research centers for telecommunications, lasers and microelectronics.

Its biggest coup came a few years ago, when it attracted LSI Logic Corp. to set up a subsidiary in Calgary. The relationship started in 1986 with a technology license to the University of Alberta in Edmonton. LSI Logic used the license proceeds to open a 55,000-square-foot application specific integrated circuit (ASIC) wafer fab of its own in Edmonton. The company reported revenue of $28 million in 1989.

Canada's semiconductor market had only received lip service from the big U.S. companies until LSI arrived on the scene, says Perry Constantine, LSI Logic Canada Ltd.'s president and CEO and a U.S. citizen. By locating in Canada, LSI Logic has been able to develop strong relationships with its customers and provide service that never existed before. As a result, Constantine's company boasts a 70% market share of Canada's ASICs. "Our competition has a long way to go to catch up," he says. □

Top Canadian semiconductor companies

Canada's semiconductor consumption



that U.S. companies are leaving the country en masse. Still, a legitimate concern by critics is that future Canadian expansion will be stifled. This is already a problem in R&D, where subsidiaries of U.S. companies in Canada spend only a fraction of what is spent in the home office. For instance, in 1989 IBM Canada Ltd. spent 4.2% of its Canadian revenue on R&D in Canada compared with a worldwide average of 11%.

In total, Canada's information technology industry spent $1.3 billion on R&D in 1988, representing 47.5% of the total R&D spending by Canadian manufacturing. That may sound impressive, but it is less than a quarter of IBM's total 1988 R&D spending.

Gary Campbell

Canada's semiconductor market had only received lip service from the big U.S. companies, LSI Logic Canada's Perry Constantine says — that is, until LSI came to town

For the most part, Canada's computer industry is made up of subsidiaries of foreign companies, most of which conduct the bulk of their research in their home country. Similarly, Canada's $300-million-a-year merchant semiconductor industry is small and geared primarily toward the telecommunications market. Mitel Corp., the country's largest merchant chip vendor, has had some success selling chipsets into Japan, but for the most part, Canadian chip vendors are not considered world-class players.

Skills needed

Besides relatively low R&D funding, Canada's electronics industry is lacking other key skills that prevent it from emulating the fertile U.S. start-up environment. At the top of the list is the lack of a sophisticated high-tech investment community and experienced managers who understand electronics. "It's a song that has been sung many times, and it's not getting any better," says Michael J. Brown, president of Ventures West Management Inc., a venture capital firm headquartered in Vancouver, British Columbia.

The problem comes back to the fact that most of Canada's high-technology companies are foreign owned, and the critical product and marketing decisions are made outside Canada, Brown says. Also, Canadians in general tend to be averse to risk, and that has implications for start-ups, he claims.

While Canada does have a number of venture funds, both government and private, the size of the venture market is still small compared with that of the United States. In 1989 Canadian venture capital firms raised only $180 million, about one quarter of which was earmarked for high-technology ventures, according to Venture Economics Canada Ltd.

Recent U.S.-owned plant closings and layoffs in Canada have brought criticism that the FTA is to blame

in Toronto. That means there is virtually no seed money available for high-technology start-ups.

"Venture capitalists [in Canada] are not at ease with high technology in general and software in particular," complains Claude Lemay, CEO of Alis Technologies Inc. in Ville St.-Laurent, Quebec, a developer of foreign-language software programs. Because of the lack of understanding and the lack of available funds, Alis was forced to go to the U.S. venture market. Ironically, one of the fund's backers turned out to be a large Canadian institutional investor.

There is another issue to contend with. "It's much more difficult finding qualified people to fill high-level jobs in Canada than it is in the United States, by far," Gandalf's Wandell comments. The main area of expertise Canadians lack is marketing. Because the country's industry is driven by natural resources, marketing differentiated products such as electronics have never been strong.

Free trade has increased the urgency for better marketing skills. According to many executives, Canadian companies are focusing more on their marketing efforts. But training and education take time, and free trade is increasing the urgency. The obvious short-term solution is to tap the market where that expertise resides.

That is exactly what software developer Cognos did. As part of its restructuring program to turn around sagging sales, Cognos split its organization down the middle, operating twin headquarters, one in Ottawa and one in Boston. The Ottawa office is responsible for R&D, finance and administration, while the Boston office heads up worldwide marketing.

Why Boston? That is where people with international marketing expertise can be found, says Michael Potter, chairman, president and CEO of Cognos.

No doubt there will be more Canadian companies taking advantage of bilateral corporate structures in the future. As the Canada-U.S. border dissolves, electronics companies north of the border will begin to lose their Canadian accents. This is a good thing, most Canadian technology executives say. "The Free Trade Agreement should certainly encourage us to work more closely and cooperatively toward achieving our common goals," ISTC's Siman says. By most accounts, that is what's happening. □

All dollar values in U.S. dollars at a conversion rate of $1.18 Canadian to $1 U.S.

Aggressive Japanese venture capital worries Silicon Valley

Deep-pocketed Japanese industrial companies are outbidding U.S. venture capitalists for the top emerging companies. Some see it as a way for Japan to grab U.S.-based technology

BY RAY WISE

The vast flow of Japanese venture capital into Silicon Valley is raising fears that Japan will become the economic top gun of the world with the help of U.S. technology.

The capital comes mainly from Japanese industrial companies with deep pockets, well able to outbid the Valley's own venture capitalists. They poured an estimated $320 million into U.S. ventures last year, nearly double the year-earlier $176 million. Most investments focus on high-technology venture in California.

Although they are not averse to pocketing profits, Japanese venture capitalists want U.S. technology — principally software — and global market share. Kubota Ltd., a leading Japanese heavy-machinery maker gives every appearance of putting together its own workstation company, piece by piece, out of U.S. leading-edge technology ventures in which it has invested about $200 million over the past five years.

Conceivably, Kubota could wind up competing head-on with Sun Microsystems Inc., Mountain View, Calif., now the leading player in workstations. That is a prospect that typifies the concerns being aired in U.S. high-tech circles. "It is ominous what we see coming on the horizon — a Japanese juggernaut," says Terence C. Rock, senior vice president of operations for Convex Computer Corp., Richardson, Texas. "We are not going to survive as a nation unless we start doing things differently. The Japanese investors are patient, and they have a lot of money. They are doing the right thing — for Japan." Adds Tom Longo, CEO of Performance Semiconductor Corp., Sunnyvale, Calif: "The standard of living of the nation as a whole is at stake."

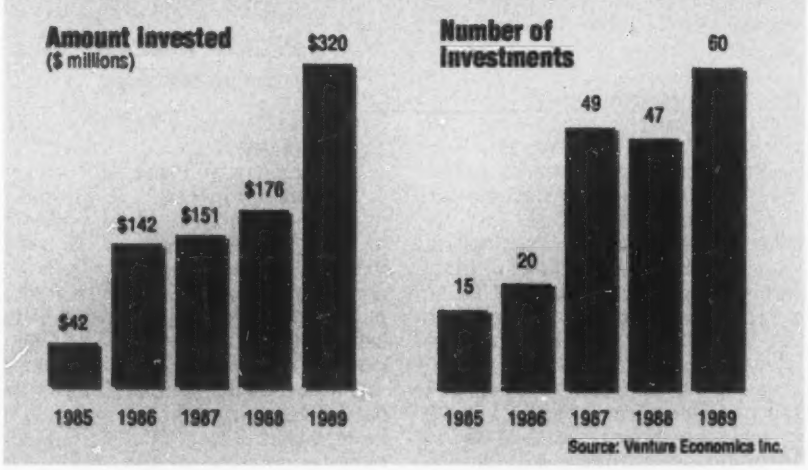
"The Japanese excel at getting their arms around a technology and building a global business out of it," says Fred M. Haney, senior vice president of 3i Ventures Corp., Newport Beach, Calif. In Haney's view, the United States is unsurpassed in managing the incubation of new ideas, but significantly less adept at dominating markets that have matured.

The venture capital deals that bother Haney and others are not always initiated by the Japanese. "Our entrepreneurs are bypassing U.S. venture capitalists," says Art Spinner, general partner of Hambro International Venture Fund, New York City. "That's the trend I'm seeing." Some entrepreneurs fear being snubbed by increasingly selective venture capitalists, or they have had some local financing but need more and can't get it in the Valley. Often in desperation, they turn to Japanese corporate investors brandishing fat checkbooks and, above all, patience.

"The farther East you go, the longer the investment time horizon," notes Henry de Vismes, managing director of Kleinwort Benson International Investments, London. "The Japanese can take a market-share view, extending over five years." A textbook case of patient investing occurred in June 1989, when Canon Inc. put up $100 million for a one-sixth interest in Steve Jobs's NeXT Inc., Fremont, Calif., which apparently has a long way to go before generating meaningful profits. "The Japanese are willing to accept investment returns of 1% or 1.5%," Rock says. "A U.S. venture capitalist who did that would be out of business."

U.S. venture capitalists cannot afford to be patient investors, because institutional investors, their main source of capital, are notoriously impatient. Moreover, investment returns on venture capital portfolios have dropped sharply in recent years. The relentless downtrend has driven

Japanese equity investments in the U.S.



some venture capitalists into later-stage investing and leveraged buy-outs and has forced others to diversify into specialty retailing and other nontechnological industries. These defections have created gaps in the U.S. venture capital marketplace that the Japanese seem only too glad to fill.

Can't compete on price

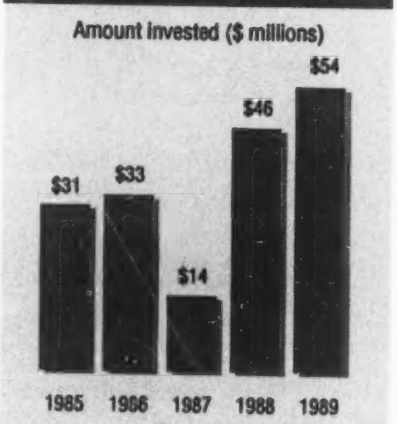
Sometimes the Japanese investors compete directly with U.S. venture capitalists, Shirley Cerrudo of Burr, Egan, Deleage & Co. reports. "They are taking our place. You can't compete with them on price." On the other hand, the Japanese also coinvest with U.S. venture capitalists and, as such, are usually welcome because they enhance the value of the portfolio company. It's as if the venture capitalist owned shares of IBM, and a big pension fund came along and bought a huge block of Big Blue's stock, driving its price up.

But some big U.S. companies also serve as venture capitalists, just like their Japanese counterparts. And they have been increasingly active in the last five years, according to Cerrudo. However, U.S. corporate coinvestors are still rare, Pierre Lemond of Sequoia Capital, Menlo Park, Calif., reports. "It is not easy to convince General Electric, IBM or Westinghouse to make these kinds of investments. We would rather have them than Fujitsu, Hitachi or Kubota."

Not that the Japanese coinvestors are difficult. "They are comfortable to do business with," says Cerrudo, "and they don't panic when things go wrong. They are so analytical that it can take six months to a year to do a deal."

The patience of Japanese investing reflects an economic and tax environment that differs sharply from that of the United States, Convex's Rock points out. "Japan rewards investment and discourages consumption. We reward consumption and discourage investment. The capital gains tax has to come down." Many in high tech believe President Bush's proposal to lower the capital gains tax would help channel investment into U.S. technology companies at all stages of development. In particular, the tax preference is seen as a way of making early-stage technology investing more attractive to U.S. venture capitalists.

Japanese investments in U.S. venture capital funds



Manufacturing capability — such as wafer fabrication facilities — is often dangled before U.S. entrepreneurs by Japanese investors in exchange for technology. Yet some in Silicon Valley assail the offshore relocation of manufacturing operations by U.S. high-tech outfits. Entrepreneurs are kidding themselves if they think they can keep ahead of the Japanese with innovation alone, Longo says. Eventually the Japanese might replicate the innovation and become well-heeled competitors who buy up market share.

The Japanese want U.S. technology — principally software — and global market share

Creating its own manufacturing capacity can benefit a U.S. company in a big way, apart from the problem of Japanese competition. Convex took that route, Rock says, and so far it has worked well. The supercomputer maker derives flexibility from being able to closely coordinate engineering, manufacturing and purchasing. If the factory were in Singapore or elsewhere in Asia, Convex would incur a host of non-value-adding administrative costs, which could not be offset by cheaper labor. Labor costs at Convex are only 5% of the total. As it is, the company prides itself on manufacturing excellence.

Attractive partners

However, a manufacturing partner can be very attractive to a fledgling company in the hugely capital intensive semiconductor business. "We have done some partnering with the Japanese, and it is positive if you manage it properly and don't give away the crown jewels," says Jon W. Bayless of SRB Management Co., Dallas. "We seek manufacturing capacity and strategic fit. We would do the same thing with Intel or Texas Instruments if they made capital available."

When a U.S. entrepreneur teams up with a Japanese manufacturing partner, "he's trading technology for manufacturing, and that's an even trade," Hambro's Spinner says. Japanese venture capital investors often structure highly constructive partnerships, helping the emerging U.S. company to attain success in the United States and Japan as well, he says. "The Japanese have been doing a better job of retaining entrepreneurs than large U.S. companies, and that should not be," the venture capitalist adds.

Henry de Vismes sees nothing sinister in the flow of Japanese venture capital to the U.S. It is driven by competitive pressures from Korea, Taiwan and other newly industrialized Asian countries, which are forcing Japan out of repetitive manufacturing and into high-value-added technological products, he says.

"The acid test will be, how many U.S. ventures financed by the Japanese end up failing?" says the multinational investment manager, who travels extensively in Asia.

Apparently there are plenty of test cases in the offing. The uptrend in Japanese investment in U.S. venture-stage companies is likely to continue, predicts Paul A. Ferrari, editor of *Corporate Venturing News*, published by Venture Economics, Needham, Mass. Other Japanese investors are Asahi Glass, Kobe Steel Ltd., Kyocera Corp., Nippon Steel and Sony Corp.

Tom Longo cautions, "The same problem that we've been having with Japanese investors is building in Korea and Taiwan." □

U.S. personal computer makers reign supreme in France

Apple, IBM and Compaq dominate sales in France. But their local competitors are fighting back for a bigger share of the booming French market

BY LOUISE MARTIN

Though sales of personal computers are lagging in the United States, business is booming in Europe. Europe, with its enviable 32% growth rate in 1989, easily outdistanced the U.S. PC market, now in the throes of its first slowdown. Lured by the strong European demand for PCs, U.S. computer companies are pitting themselves against European companies for a stake in the British, West German and French markets. Together, these three countries account for more than half of the 5 million business personal computers sold in Europe in 1989.

After West Germany, no European country consumed more business computers than France did in 1989. In 1987 France ranked first in business personal computer unit sales, according to Dataquest, despite a population smaller than that of West Germany or Britain. Sales of PCs in France reached 770,000 machines in 1989, up 18.5% in unit sales from 1988 and 30% in value terms, according to International Data Corp. (IDC) France. The market research firm predicts that the $3 billion market should grow 10% through 1992 despite a relative slowdown in 1990.

There are several factors behind the strength of the French microcomputer market. The business community has realized that with European economic integration in 1992, the PC will be an indispensable tool for responding more quickly to customers. Demand is particularly strong among small- and medium-sized businesses: 82% of them will have purchased a personal computer by 1990, predicts UFB Locabail, a French leasing company based in Paris that annually surveys the computer use of French companies with fewer than 200 employees. As recently as 1987, less than half of those companies owned a personal computer.

The demand won't end soon. Almost 43% of French white-collar workers will be using personal computers in 1992, Dataquest predicts, compared with 38.1% in Britain and 42% in West Germany.

Tom Barrett

U.S. manufacturers claim the lion's share of French microcomputer sales. Taken together, the French subsidiaries of IBM, Apple Computer Inc. and Compaq Computer Corp. held more than 35% of the market in unit sales and 40% in value terms in 1989, according to Dataquest.

Number one IBM is clearly losing ground. Eroding in other European markets as well, its market share in France was 16% in 1989, down nearly two points from 1988 and four points from 1985, IDC estimates.

IBM's loss has been Apple's gain.

Apple is the country's number two microcomputer vendor, making France Apple's number one market outside the United States. In addition, France is the only European country where Apple still can claim a larger market share than Compaq. Elsewhere in Europe, Compaq has leapfrogged past Apple and Italy's Olivetti Corp. to become Europe's number two personal computer vendor, Dataquest says.

Open for business since 1982, Apple Computer France saw a 45% hike in revenue to $383.3 million in fiscal year 1989. The French subsidiary contributes some 30% to European revenue, outperforming Apple Computer Europe, which had sales growth of 41% in 1989. Apple Europe contributed $1.2 billion to Apple's worldwide sales of $5.4 billion.

Apple France's success is attributed to the marketing talents of Michael Spindler, who until last February headed the company's European operations. Recently promoted to the position of executive vice president and chief operating officer in Cupertino, Calif., Spindler's new challenge is revitalizing Apple's sagging U.S. sales.

Apple's outstanding performance in France is linked in part to the par-

ticular appeal of the Macintosh to the French, known the world over as die-hard individualists. A different explanation is preferred by Jean-Jacques Maucuer, Apple Computer France's sales director: "Contrary to popular belief, Apple computers are business computers. Our stronghold in large accounts is the proof."

Hooking large accounts with more than 100 systems has been no small task. Large businesses in France have been skeptical of the Macintosh in the past. Yet Apple's effort to seduce big clients obviously has paid off. Today one large account out of five has at least 100 Macintosh computers, and 18 out of 500 accounts have 500 or more, company sources claim. A quarter of Apple Computer France's revenue came from large accounts in 1989, says Maucuer, who predicts that this percentage will reach 30% by 1990.

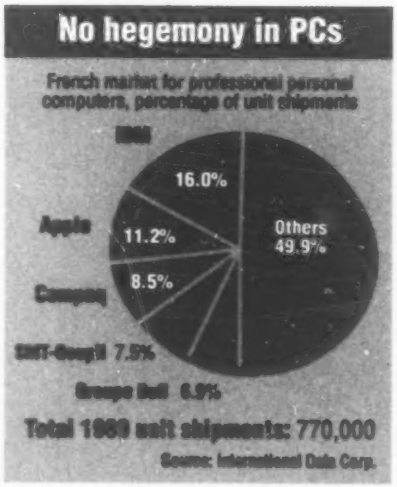
A dealers-only approach

Basking in its own success in penetrating the French market, Houston-based archrival Compaq acknowledges its debt to Apple. "If France has been particularly receptive to the concept of personal computing, it is in large part due to the success of the Macintosh in France," says Eckhard Pfeiffer, president of international operations at Compaq's European headquarters in Munich.

A mere three years after the creation of its French subsidiary, the company jumped from fifth position in unit sales in the French market in 1988 to third position in 1989. Its 1988 earnings, up an incredible 157% from 1987, reached $304 million in 1989, up 72%. France accounted for 22% of the company's worldwide sales of $1.3 billion in 1989.

The dealers-only approach that proved so successful in the United States has been a significant factor in Compaq's success in France. Compaq France ships only to upscale dealers offering service and support to their business customers. "Today we are not the only ones with this strategy," affirms Bernard Maniglier, director of Compaq France. "But back in 1982 Compaq was the only company that believed in it and the first to act on it."

In early 1989 Maniglier defined Compaq France's two major objectives: to increase the company's presence outside of Paris and to boost its



sales to large accounts. "As a Paris-based company, our coverage outside the capital was insufficient," explains Thierry Labbe, Compaq France's marketing director.

Last year Compaq opened an office in Lyon and 10 business centers in France's major provincial cities.

France is the only European country where Apple still can claim a larger market share than Compaq

"Our centers do not sell directly nor do they seek to pair up buyers with distributors," Labbe stresses. "They were set up to better acquaint prospective clients with our products." He claims their presence improved Compaq's regional position, particularly in large regional accounts.

He cites as an example Compaq's contracts in the aeronautics industry based in Toulouse and the insurance sector based near Nantes in Brittany. "We will continue to target large clients in 1990," says Maniglier, who claims these now make up a quarter of Compaq France's sales.

Shakeout under way

Meanwhile, France's own microcomputer companies have been struggling for a place in the sun. Taken together, a half dozen French manufacturers account for less than a quarter of unit sales in their home market.

A shakeout already under way is unlikely to end soon. The past two years witnessed the disappearance of several French personal computer companies — some were bought; others just threw in the towel. Those remaining are now scrambling to reposition themselves for 1992.

In early 1988 French personal computer manufacturer Leanord and its parent company Groupe Intertechnique, a midrange systems vendor, were acquired by West Germany's Siemens AG. That year also saw the demise of Thomson Micro-Informatique and Matra Datasysteme, the microcomputer divisions of Thomson-CSF and Matra SA, two state-owned and -run companies. To a great extent, these companies owed their existence to the French government's vigorous Buy French Computers campaign of the early 1980s. Their failure to ever walk without crutches marked the end of the government's attempt to make French companies serious contenders in the nation's growing PC market.

The shakeout picked up speed in 1989. In late December, SMT-Goupil took control of Normerel Systemes, the nation's third-ranked microcomputer manufacturer.

Also in December, Groupe Bull, the nation's largest computer company, finalized its takeover of the microcomputer activity of Zenith Electronics Corp. The purchase propelled Bull to its rank as the sixth largest PC manufacturer worldwide. Bull's own line of PCs will be progressively phased out and blended into the Zenith Data Systems line. Zenith will produce PCs for the European market at Bull's factory in Normandy. Microcomputers accounted for 30% of Bull's $6.7 billion revenue in 1989.

Bull and SMT-Goupil are the last two major survivors of France's computer industry. The French government remains the number one client of both companies — more than one-half the computers used by the government and state-run companies bear the Bull label. And SMT-Goupil sells one out of every three computers it makes to the state.

It's unclear how the fragile French PC manufacturers will compete outside France. First, they must overcome a long tradition of insularity. Today that break from tradition is far from complete. □

Sales growth slows for U.S. companies in Japan

Despite the cheap dollar and strong pressure to buy American last year, most U.S. electronics companies in Japan saw little improvement in demand

BY PAULA DOE

U.S. electronics companies in Japan had every reason to expect 1989 to be a banner year. In 1988 the 20 leading U.S. companies in Japan saw their sales jump by an impressive 32% on average, suggesting they were finally making real inroads in that difficult market. U.S. products remained a bargain at an average exchange rate of 138 yen to the dollar, Japanese domestic demand was strong, and both the U.S. and Japanese governments were pressuring the Japanese to buy, buy, buy those U.S. products.

But the big U.S. gains in the Japanese electronics market didn't continue into 1989. Sales growth last year slowed markedly at almost all the major U.S. companies in Japan. Indeed, growth rates at many of the major semiconductor producers and computer makers didn't even keep up with overall growth in market demand.

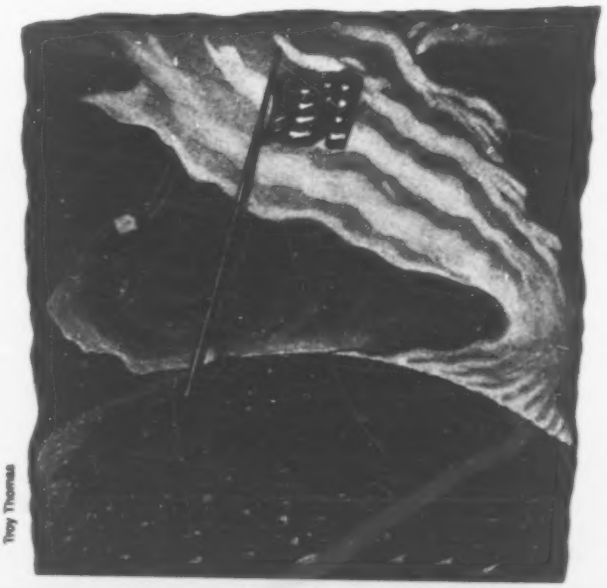
The 20 leading U.S. electronics companies in Japan together sold $19.3 billion worth of electronics products into that market in fiscal 1989 — less than a 5% increase over 1988's $18.4 billion in dollars, but a respectable 12% increase when measured in yen. For comparison, the total Japanese domestic electronics output was roughly $165 billion in 1989, according to Electronics Industry Association of Japan figures.

Median sales growth figures paint a slightly different picture, since the handful of U.S. giants operating in Japan skew the total percentages. In 1988 the median sales growth at the top 20 U.S. companies was 18%, and all the companies made double-digit gains except three, two of which were in the sluggish Japanese defense sector. Growth in 1989 was slower at almost every company. Median growth was only 12%, while about half the companies dropped to single-digit gains, including some of the largest companies.

Five U.S. giants in Japan had sales of close to $1 billion or more, but the overall numbers drop off rapidly after that. A U.S. company in Japan needs sales of only $150 million or so to make the top 20, yet few U.S. companies earn even $100 million.

The slowdown suggests that 1988's growth spurt was a one-time adjustment, not the start of long-term structural change. The soaring yen in 1988 combined with the political pressure to buy U.S. goods enabled the relatively small Japanese-based units of U.S. companies to make big percentage gains in sales. Now that they've become larger, they're not likely to see such a big percentage growth.

Moreover, growth percentages in 1988 look high in part because the companies' sales in Japan before that were so small. Many of the sales made in 1988 were the easy gains — the additional sales of the most technologically competitive and most cost-competitive goods to the customers most willing to buy more U.S. products. Now it's back to hard slogging.

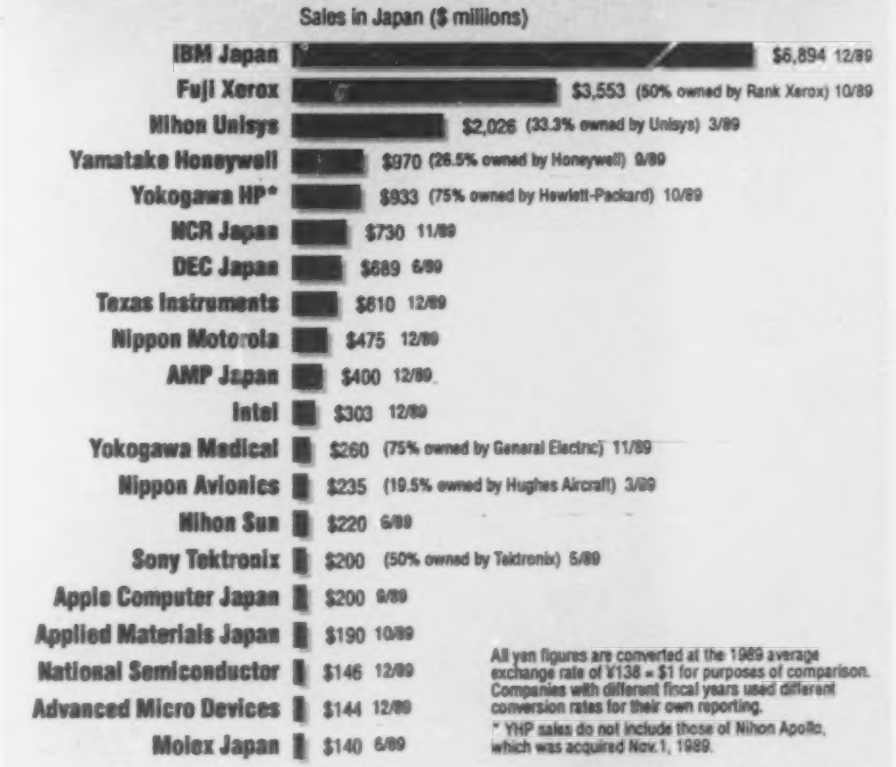


Troy Thomas

Some companies were able to buck last year's slowing trend. U.S. computer makers with leading technology in fast-growing niches such as workstations and fault-tolerant computers saw fast growth, for example. Sun Microsystems Inc.'s sales in Japan nearly doubled to roughly $220 million, making the top 20 for the first time. Digital Equipment Corp. Japan also grew faster than its Japanese rivals, increasing sales of computers in Japan by 30% to some $689 million. Tandem Computers Inc.'s sales in Japan jumped 78% to $114 million, although the company remained too small to make our list.

A few other large U.S. computer companies also outpaced the overall 13%

Top U.S. companies in Japan


Sales in Japan ($ millions)
IBM Japan $6,894 12/89
Fuji Xerox $3,553 (50% owned by Rank Xerox) 10/89
Nihon Unisys $2,026 (33.3% owned by Unisys) 3/89
Yamatake Honeywell $970 (26.5% owned by Honeywell) 9/89
Yokogawa HP* $933 (75% owned by Hewlett-Packard) 10/89
NCR Japan $730 11/89
DEC Japan $689 6/89
Texas Instruments $610 12/89
Nippon Motorola $475 12/89
AMP Japan $400 12/89
Intel $303 12/89
Yokogawa Medical $260 (75% owned by General Electric) 11/89
Nippon Avionics $235 (19.5% owned by Hughes Aircraft) 3/89
Nihon Sun $220 6/89
Sony Tektronix $200 (50% owned by Tektronix) 5/89
Apple Computer Japan $200 9/89
Applied Materials Japan $190 10/89
National Semiconductor $146 12/89
Advanced Micro Devices $144 12/89
Molex Japan $140 6/89

All yen figures are converted at the 1989 average exchange rate of ¥138 = $1 for purposes of comparison. Companies with different fiscal years used different conversion rates for their own reporting.

* YHP sales do not include those of Nihon Apollo, which was acquired Nov.1, 1989.

Source: ELECTRONIC BUSINESS, Dataquest Inc.

annual growth of the Japanese computer market estimated by the Ministry of International Trade and Industry. In fiscal 1989 the $38 billion Japanese computer hardware market grew by 23.4% in sales of engineering workstations and minicomputers and 20.3% in personal computers and office workstations, according to figures by the electronics industry magazine *Nikkei Computer*. Sales of computers and systems at Fuji Xerox Co. Ltd. were up 23% to some $900 million; at Yokogawa-Hewlett-Packard Ltd. sales were up 19% to about $930 million.

However, the largest U.S. computer companies in Japan, which rely more on sales of mainframe computers, made no big gains in 1989. Total sales of office computers in Japan climbed 12% and mainframes 10%, according to *Nikkei Computer*. IBM Japan Ltd. increased its sales in Japan 14%, Nihon Unisys 8% (for the year ended March 1989) and NCR Japan Ltd. 6%.

Other companies with the right technology and commitment to the market continued to shine. Applied Materials Japan Inc. increased its sales 45% to $190 million. And that's in a semiconductor production equipment market that saw only 10% growth overall for the year, according to the Japanese research and publishing company Press Journal.

Despite the highly publicized Japanese efforts to buy more U.S.- made semiconductors and boost the U.S. share of the Japanese chip market to 20% by 1991, most U.S. semiconductor makers' sales in Japan barely kept up with the basic 14% growth of the market overall, according to figures by market researcher Dataquest Inc. of San Jose. Advanced Micro Devices Inc. increased its chip sales in Japan by 15%, Intel Corp. by 13%, Texas Instruments Inc. by 8%. Indeed, most of these companies saw much higher percentage growth the year before. Advanced Micro Devices increased chip sales in Japan 39% in 1988, Intel 65% and Texas Instruments 32%.

Motorola outpaces market

Alone among the major U.S. semiconductor makers, Motorola Inc. grew faster than the market. That company's semiconductor sales in Japan were up 31% in 1989 to some $356 million, according to Dataquest estimates. Nippon Motorola Ltd.'s total sales of semiconductors and telecommunications equipment jumped by 49% in 1989 to around $594 million (including exports outside Japan), according to Tokyo Shoko Research Ltd. estimates, thanks to strong demand both for its telecommunications equipment and its locally produced chips that count towards U.S. market share.

Another company that saw strong growth was Rockwell International Corp. Its Japanese semiconductor sales jumped 28% to about $106 million, still not quite large enough to make the top 20. □

Conversion rate: ¥138 = $1.

ELECTRONIC BUSINESS estimates major U.S. electronics companies' sales in Japan from company reports, Japanese government documents, discussions with company officials and market research firms. While the major joint ventures publicly report detailed financial results, many companies do not officially release separate figures for Japan. Companies that sell through agents and do not have their own separate corporate units in Japan are excluded.

Coming soon: Design automation with interchangeable tools

Frameworks that let designers use assorted automated design tools from several vendors are transforming the highly competitive EDA industry

BY PETER BURROWS

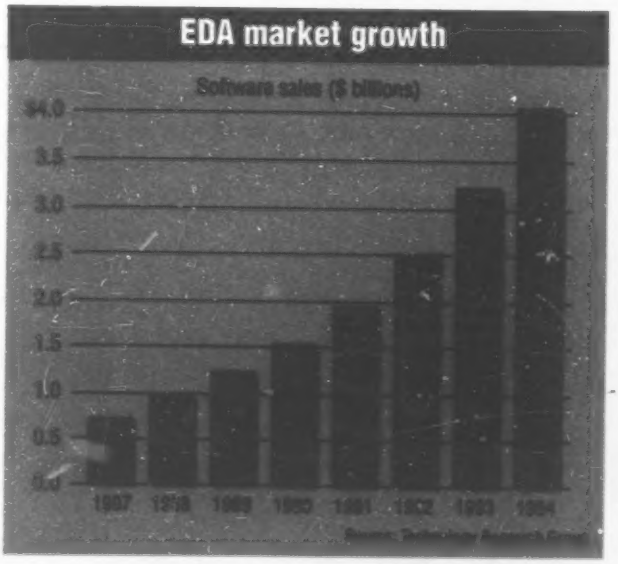
Vendors of electronic design automation (EDA) tools are collectively drawing a new blueprint for their industry. The look, when finished sometime in the mid-1990s, will be completely new, observers say: Commitment to openness will replace the hardheaded devotion to proprietary systems of previous years; standards will emerge where they were spurned before; and the once freewheeling market structure will evolve into a two-tiered configuration.

It takes many influences to bring about this much change, but one trend is critical — the rise of framework technology. Frameworks are system software packages that will permit customers to use EDA tools from many vendors in one tightly linked environment. These products have been on the market in different forms for the past few years, but this spring a continuing stream of new products is setting the stage for the next generation of EDA market expansion.

Customers, long frustrated in their attempts to make use of the hard-to-find and hard-to-integrate tools scattered throughout the market, are actually forcing this growth. "In the past EDA companies just wanted to crush and dominate the competition totally, but we have now found that the world's just not like that," says Robert A. Carver, a program director at Cadence Design Systems Inc. in San Jose who is also vice president of an industry standards organization called the CAD Framework Initiative (CFI). "Customers want the ability to mix and match to their hearts' content."

"We are definitely looking forward to frameworks," confirms Joseph Zagami, electronic computer-aided design (CAD) supervisor for Polaroid Corp. in Cambridge, Mass. "From what I've seen, they are pretty impressive. They should take the learning curve out of using CAD." It took Polaroid engineers a year to become proficient with the company's current EDA system, based primarily on tools from Mentor Graphics Corp. in Beaverton, Ore., Zagami says. "With [Mentor's new Falcon framework], it should take only two or three months," he says.

Vendors that can provide such customized solutions profitably and on a regular basis will take home the largest slices of a rapidly growing EDA pie. Driven by increasing product complexity and time-to-market pressures, EDA is expected to grow from $1.2 billion in 1989 to more than $4 billion by 1994, reports Boston-based Technology Research Group (TRG). The sale of frameworks and integration services will give EDA competitors a lucrative platform for tool sales. Frameworks will be responsible for 30% of EDA market growth over the next five years, estimates Charles Foundyller, president of Cambridge-based market researcher Daratech Inc.



The framework era takes shape

The race to be in on the coming harvest is rapidly reshaping the EDA industry. Historically, EDA has been a highly segmented industry. Last year the top 10 vendors held only 50% of the market share, market researcher Dataquest Inc. in San Jose reports. But in the not too distant future, companies will fall into two general categories: an exclusive coterie of well-heeled, broad-line EDA vendors who sell frameworks as a means to increase EDA tool sales and to reap revenue as systems integrators; and a vibrant crowd of niche players who flourish by offering technology to meet the market's more specialized needs.

Competition is already hot in both segments. Small high-tech shops are capitalizing on emerging markets in analog simulation, design and test synthesis, and system level testing, while broad-line companies such as Mentor Graphics, Cadence Design Systems, Valid Logic Systems Inc. and Daisy/Cadnetix Inc. are hustling to copy or acquire their best work. The fiercest race, however, is to develop the

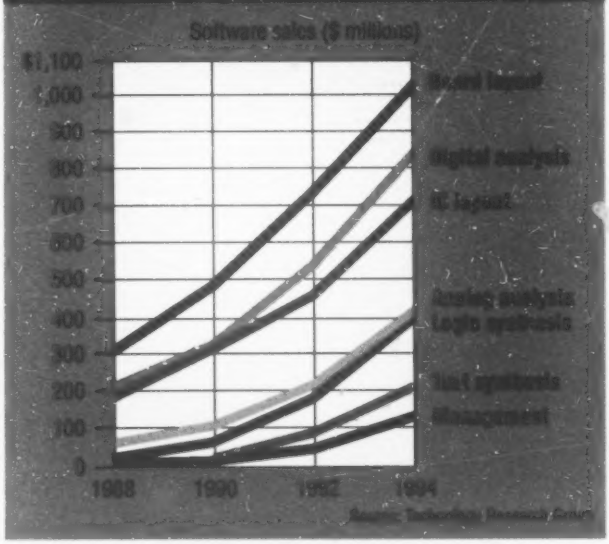
framework technology itself:

- Market leader Mentor Graphics has spent $75 million over three years to develop its version 8.0 concurrent design environment, which includes the long-awaited Falcon framework, announced this month.
- Fast-rising Cadence, which vaulted into second place in the market share race in 1989, introduced its second-generation Design Framework product in May. The company began selling this product, the first commercially successful EDA framework to hit the market, four years ago.
- Valid Logic Systems Inc. in San Jose and Daisy/Cadnetix Inc. in Sunnyvale, Calif., are bringing their frameworks to market in pieces as fast as possible and are remarketing older semi-integrated product lines as well.
- Newcomers such as European CAD powerhouse Racal-Redac Inc. with U.S. headquarters in Westford, Mass., second-tier integrated circuit (IC) design player Viewlogic Systems Inc. in Marlboro, Mass., NEC Electronics' ASIC division in Mountain View, Calif., and the automatic test equipment company Teradyne Inc.'s EDA group in Santa Clara, Calif., are hawking miniframeworks that focus on their respective areas of expertise.
- Computer behemoths such as Digital Equipment Corp., Hewlett-Packard Co. and IBM have entered the race as a way to add value to their hardware to fight falling profit margins.

The stakes are heightened by the possibility of a de facto standard emerging. While the industry has made impressive strides to develop a negotiated standard through the CFI trade group, many believe the obstacles are too great for an agreement to be forged in time to meet the market's needs. "The longer it takes for standards to evolve," says Ron Collett, a vice president with Dataquest, "the faster a de facto standard will emerge."

Adds TRG analyst Cindy Thames, "It may not be a winner-take-all situation, but it's definitely a winner-take-a-lot situation."

EDA segments on the move



The most likely beneficiary in such a scenario — a prospect that keeps other competitors up at night — is Mentor Graphics. The market leader, which had a more than $100 million lead in revenues over its nearest competitor in 1989, will have significant market influence when its new framework begins shipping in the third quarter of this year. "Overnight it is going to upgrade 20,000 seats for free," Collett says, "and that's a significant portion of the design community."

Vendors that provide customized solutions will take home the largest slices of a growing EDA pie

Others disagree. "We're not going to see any revolution," says Ghulam M. Nurie, product marketing director for Daisy/Cadnetix. "Each of the major players has a very large installed base, and people are not going to change overnight to a new standard."

The new openness

Despite all the attention, experts say a truly easy-to-use, fully functional framework is still years away. In fact, there is not yet total agreement on what such a system should include. But the potential benefits for users are undeniable. While many EDA tools are still used in isolation, frameworks will allow engineers to use diverse products that share a common user interface for a uniform look and feel, a common database to permit designers to work concurrently with each other and with multiple tools at the same time, and management software to provide process control to ensure a smooth design cycle. Rather than being tied to a particular computer, tools will reside on networks to give users more convenient access, and they will be portable among hardware platforms.

But frameworks will not only change the way engineers use EDA — they will also change the EDA industry itself. "Frameworks require a more forward-looking view of this business," according to Cadence's Carver. The philosophy, a revelation in the heretofore combative world of EDA, is this: "If we make the customers happier, the entire market grows."

The most remarkable turnaround is the declared commitment to openness by the industry's larger competitors. "It has become clear that no one company can provide all of the tools the customer needs," Daisy/Cadnetix's Nurie says. Customers will instead purchase framework software and selected core tools from a broadline EDA vendor and use in-house or third-party tools to round out their needs. "It will be much more competitive," Nurie says, "and the winner will be the one with the easiest interface and the easiest integration of tools."

Mentor chief executive and chairman Thomas H. Bruggere agrees with this new view of the EDA business. "As long as we're doing what's best for customers, then we'll continue to be the market leader," he says. "That means providing the best framework, the best point tools and the best integration. If someone decides on a tool that we don't provide or that they think is better,

The drive for standards

Frameworks will increase the size of the EDA market, but growth could go through the roof if competitors come up with an industry standard, according to analysts.

Customers could then confidently buy tools with the knowledge that their investment was protected, and they could get the best the vibrant EDA community has to offer in a timely manner. Vendors would be free to focus their resources on improving their products, rather than on finding ways to interface with the various frameworks on the market.

"Companies are now spending 50% to 60% of their resources on nontool development," estimates James T. Hammock, vice president of Mentor Graphics' silicon design division and chairman of an industry group called Electronic Design Automation Companies (EDAC). "If we could agree on some standards, we could bring that down to 10% or 20%. The end result is that companies could focus more on improving their productivity tools."

So far industry efforts to come up with standards have been impressive. The official standards organization is the CAD Framework Initiative. Announced last November, the group already counts 30 of the 50-plus EDA companies worldwide among its members. "Several vendors have offered their way of doing certain things," says Tom Rhyne, manager of the CAD Framework Laboratory, a technical support service for the CFI, "and a process of consensus building is starting to take over."

Despite some finger pointing and rumors of lukewarm commitment by some, progress is proceeding rapidly. Five of the group's seven committees plan to propose standards guidelines this month, and Rhyne predicts that several pieces of the standard will be adopted by November. "I want to dispel the idea that it's going to take years," he says. "We have made significant progress in two years."

So far industry efforts to come up with standards have been impressive

Other organizations are also working to speed up the process. The CAD program of the Microelectronics and Computer Technology Corp. (MCC) in Austin, Texas, has set up the CAD Framework Satellite, a two-year old laboratory that serves as a prototyping center for standards proposed by CFI and as a resource for member companies interested in learning how to interface their systems to the emerging standards. So far Cadence is the only EDA company to join the group.

More than 40 companies representing better than 90% of the EDA industry have also joined EDAC, which is dedicated to forging an industry standard, among other things. "We all laughed the first time we sat down in the same room together," says Joe Prang, a vice president at Valid Logic who is currently chairman of EDAC's image committee. "We all still compete as aggressively as we ever did, but standards is one thing we can all agree on. We have all realized that it is to our advantage to increase the size of the pie."

These efforts are a huge step forward for the adolescent EDA industry, but a negotiated agreement is unlikely in the short term. A framework standard requires a slew of ministandards — hardware platform, operating system, user interface, windowing technology, database, network, data interchange formats, and documentation, to name a few.

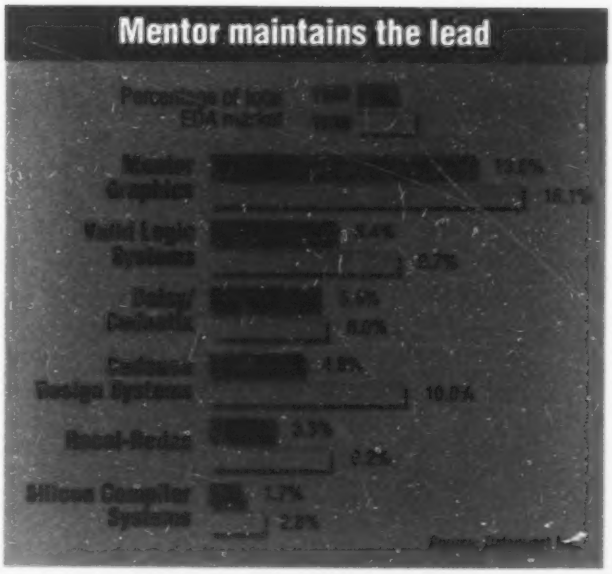
"I think we're going to have four or five company standards for years to come," says Philip Hayward, president and CEO of Quickturn Systems. "Let's be realistic. If there's an obvious standard, no one will follow because they don't want to risk their installed base. If it's a hybrid [of many vendors' frameworks], no one will follow because they have too much invested in their own system."

Rhyne contends, "But the goal is not to have one all-encompassing framework standard. It will be an incremental process, and we hope to ultimately get agreement on 80% — maybe 50% — of the issues. It's probably safe to say [the EDA companies] will continue to kick themselves to death in some areas indefinitely." □

EDAC's chairman James T. Hammock: Standards would let EDA companies keep more on improving their tools without worrying about integration.

then we say that's fine."

For these toolmakers-turned-integrators, access to the widest possible variety of tools is a requisite for success. As such, prominent EDA players are utilizing a variety of strategies to make theirs the most comprehensive design environment available. In-house tool development has continued full speed for those who can afford it. "You have to own your own tools," says Lutz Henckels, president of Racal Redac Inc., the U.S. arm of Racal-Redac Group Ltd. "It is not practical to think you can have a skinny framework, the bulk of which comes from third-party vendors. How do you know they are even going to be around in the future?"



Mentor, for example, spent more than 400 worker-years on a new complement of electrical analysis tools scheduled for introduction this month. "If you have to face your competitors' products in your own [framework] environment, then you've got to be able to beat them head on," says Geoffrey Bunza, general manager of Mentor's design and analysis Division. "It's not an either/or. You need the environment, and you need the tools."

Acquiring technology

Mergers and acquisitions are — and are expected to remain — a popular means of obtaining technology. Mentor Graphics acquired Silicon Compiler Systems Corp. in San Jose in January to strengthen its offering in IC design, just as Cadence in April swallowed Automated Systems Inc. in Brookfield, Wis., to help it break into the systems design market. Racal-Redac, seeking to build on its strength in CAD, has purchased HHB Systems Inc. in Mahwah, N.J., Silc Technologies Inc. in Burlington, Mass., and French company Thom' 6 in just over a year in order to compete in a wider range of electronic design markets.

In theory, the new openness should be a boon to the many small niche players who have traditionally had to forge sales channels on their own. In the framework era, these companies will have an increased role as broadline competitors search for the product diversity their customers are demanding. "The value of the broadline tools supplier will be that it has the foundation and the integration for niche players to tie into," says Philip A. Kaufman, president and CEO of Mountain View-based toolmaker Quickturn Systems Inc., which makes a popular line of hardware emulation tools."[The broad-line vendor] probably doesn't have the best solution for every company simultaneously, but it can usually find a way to get it."

Frameworks will not only change the way EDA is used — they're changing EDA itself

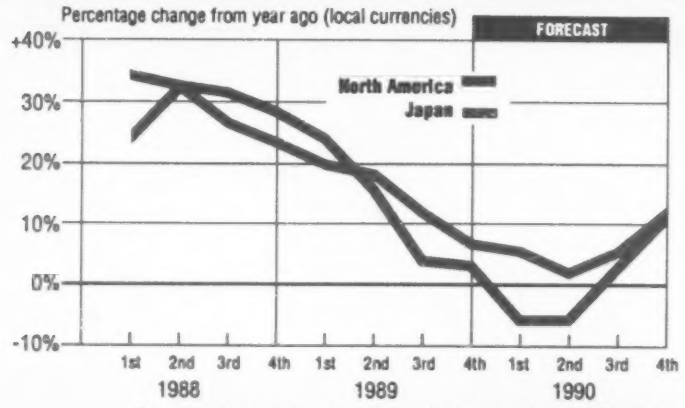
For companies with unique technology, these tidings of good times probably hold true. "Many niche players will be able to compete better than in the past and will plug in wherever they are wanted," says Ken Neff, vice president of San Jose-based Prime Data. "Before, they couldn't compete with the extensive sales staffs of their larger competitors, but frameworks give them a way to step right into the mainstream."

Framework vendors in search of product breadth are even offering enticements to attract third-party vendors to integrate with their systems. Mentor has an Open-Door program, through which third-party players and in-house designers get free software and data to assist in the process, as well as access to a lab where they can work directly with Mentor personnel. The company does charge for these services, starting at $15,000 for vendors who want rudimentary levels of integration. Cadence, Valid Logic and Viewlogic have all organized coalitions with application-specific IC foundries in order to be bundled in with these companies' highly customized tool sets.

But for all the talk of openness, EDA's small fry still face serious disadvantages. Companies with innovative technology often find their products are quietly copied in the halls of the market leaders after a few months, and small companies without a unique capability may be worse off than before the rise of frameworks. "Some of the framework companies make their own products more user friendly and make our product seem more cumbersome to use," according to Jeff Langner, sales and marketing director for Meta Software Corp. in Cambridge, which makes an analog simulator that competes directly with a product already sold by Cadence. "The playing field is not quite level. [Cadence] makes us look bad even though we've got a better product."

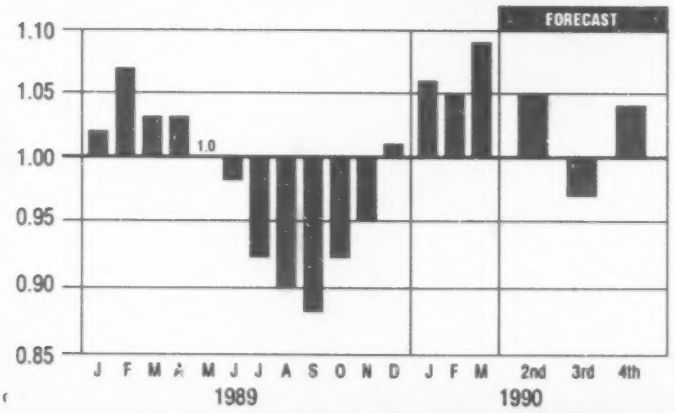
"Frameworks are great for the customer and great for the EDA company, says Wayne A. Gutschick, president of MINC Inc., a design synthesis tool company in Colorado Springs, but how does a third-party vendor guarantee a return on the investment [of integrating with the framework]?" Gutschick only deals on an original equipment manufacturer basis with framework vendors. "If they aren't willing to put real dollars on the table to make it work, then why do it? You just lose control of the product, and then there's no one committed to selling your stuff." □

Semiconductor sales to North America and Japan



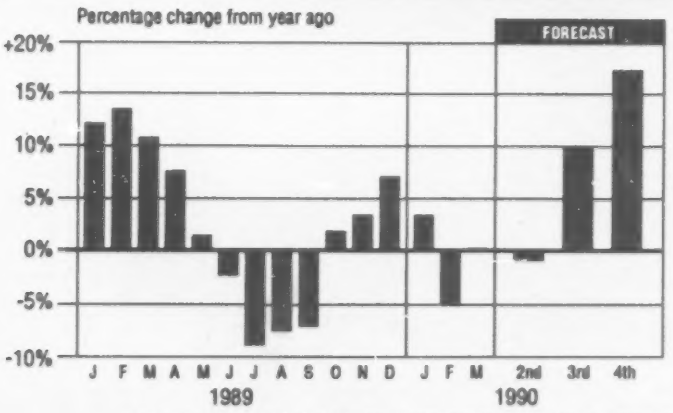
Data source: Semiconductor Industry Association; Forecast: Cahners Economics

Semiconductor book-to-bill ratio



Data source: Semiconductor Industry Association; Forecast: Cahners Economics

Semiconductor bookings



Data source: Semiconductor Industry Association; Forecast: Cahners Economics

Semiconductor statistics tell an uncertain story

Semiconductor makers may be grinning after the first-quarter performance in the almighty book-to-bill ratio. After hitting bottom last September at 0.88, the book-to-bill ratio rose to 1.06 in January, 1.05 in February and 1.09 in March. (A ratio of 1.09 means that for every $100 worth of products shipped, manufacturers received $109 worth of new orders.)

Unfortunately, those grins turn to grimaces when the activity underlying the book-to-bill ratio is revealed. The surge in the ratio this past March was due not to a strong upturn in orders, but to a sharp cutback in shipments. Shipments for the three months ending March 1990 fell 5.4% below year-ago levels. Orders fell 0.4%.

Why the slowdown in shipments? First, this is an uncertain time in the semiconductor business cycle. Demand from customers is showing spotty improvement, so shipments and orders reflect that uncertainty. Second, because inventory controls at customers' factories are much tighter compared with a year or two ago, demand filters through to production more quickly.

This pattern of recovery is unusual for the semiconductor marketplace and is challenging for forecasters accustomed to more traditional economic signals. In the past, semiconductor sales have typically exhibited more violent swings, but this time the swings are softened. The reason is no inventory overhang. That means semiconductor orders will be responding each month more in line with actual monthly activity in end-user markets.

The first half of 1990 is checkered with ups and downs. With a little luck, the scenario for a full-fledged resumption to bold growth will be played out in the second half of this year. In the following months lower interest rates will spur increased investment in information processing equipment, which will drive semiconductor sales.

Expect the growth trend in semiconductors to turn the corner this summer after discounting for seasonality. By the final quarter of 1990 the Cahners Economics semiconductor shipments forecast calls for a healthy 11% gain over the last three months of 1989. On an annual basis the forecast calls for about a 1% gain in shipments this year and a 15% rise in 1991. Add a little technological change to boost demand, and the prospects for a healthy 1991 look even more promising.

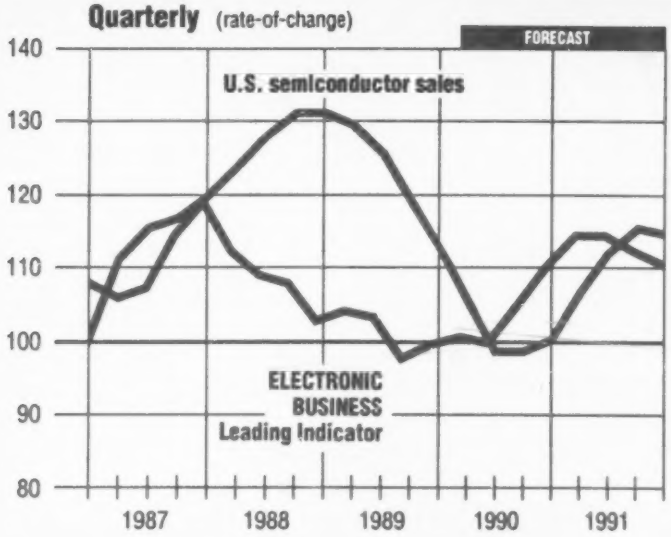
ELIZABETH B. BAATZ, Cahners Economics

BUSINESS BAROMETER

FORECASTS FOR ELECTRONICS, COMPUTERS AND SYSTEMS

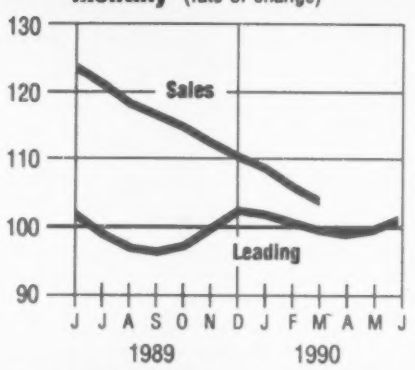
ELECTRONIC BUSINESS Leading Indicator

Quarterly (rate-of-change)



SPECIAL OFFER: A detailed 12-page background paper is available on the ELECTRONIC BUSINESS leading indicator. To obtain a complimentary copy, please contact Linda Spiller at Cahners Publishing Co., 275 Washington St., Newton, Mass. 02158-1630 USA, telephone (617) 558-4397, fax (617) 558-4402

Monthly (rate-of-change)



The ELECTRONIC BUSINESS Leading Indicator slipped from a revised 100.5 in February to 99.5 in March. The weakening in the EBLI was fueled by a decline in the electronic component leadtimes index, which fell from 94.6 in February to 84.8 in March (1977=100). Expect the EBLI to waver between 99 to 100 for the next few months and gradually push upward as the summer months approach. The EBLI is forecast to reach a peak level in the first half of next year.

Source: Cahners Economics

Electronics industry indicators this month

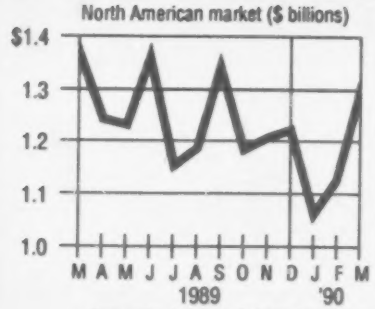
	Latest month	Previous month	Year ago	1989 average
ELECTRONIC BUSINESS Leading Indicator (rate-of-change, March)	99.5	100.5	104.6	100.9
U.S. semiconductor bookings ($ millions, 3-month average, March)	$1,267	$1,202	$1,264	$1,205
Weekly hours of semiconductor production workers (monthly average, Feb.)	40.6	40.2	39.3	40.1
Electronic components leadtime index (1977 = 100, April)	82.9	84.8	117.7	102.5
S&P's semiconductor stock price index (1970 =10, monthly average, March)	67.0	61.9	47.4	54.7
Change in electronic components inventories ($ millions, SA, Feb.)	-$14	-$1	+$95	-$12.8
Contracts and orders for plant and equipment ($ billions, SA, Feb.)	$40.0	$43.0	$41.5	$43.4

SA = seasonally adjusted, all other data are not seasonally adjusted

Sources: Semiconductor Industry Association, U.S. Bureau of Labor Statistics, *Electronics Purchasing* magazine, Standard & Poor's, U.S. Department of Commerce, U.S. Bureau of Economic Analysis

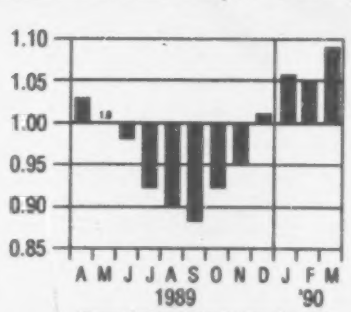
Semiconductor sales

North American market ($ billions)



Source: Semiconductor Industry Association

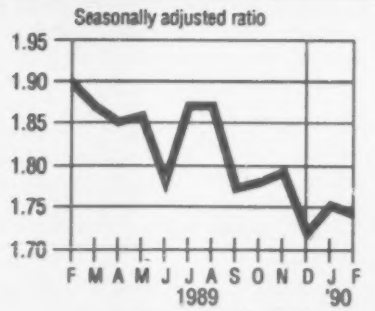
Semiconductor book-to-bill ratio



Source: Semiconductor Industry Association

Component inventory-to-shipments

Seasonally adjusted ratio



Source: U.S. Department of Commerce